

Action - slow if food contains a lot of fat.  
- proceeds 1 to 3 hr. after meal.

Food leaves stomach as chyme, produced by gastric mucus.

Gastric glands have 2 parts.

- 1) chief cells manufacture pepsin.
- 2) parietal cells manufacture acid.

Small intestine

contains 3 ferments.

- 1) pancreatic juice - from pancreas.
- 2) bile - from liver
- 3) intestinal juice - produced by intestinal villi.

Pancreas - long, thin organ.

- contains glands + ductless glands.
- Is. of Langerhans in  
- produce insulin, absorbed directly into the blood stream.  
- insulin is a hormone.

Hormone - a chemical agent affecting profound changes in foods.

- insulin needed to break down glucose.
- adrenelin poured into blood stream on shock. Stimulates heart + muscle activity.  
Adrenal glands are above kidneys.

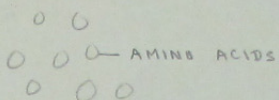
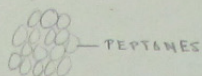
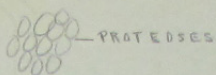
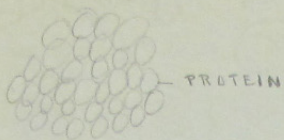
Liver - largest organ in the body.

- made up of folds.
- ducts empty into gall-bladder, which stores bile.

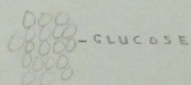
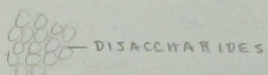
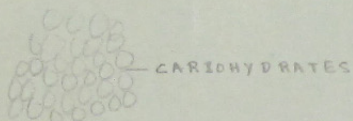


# CHEMICAL BREAKDOWNS.

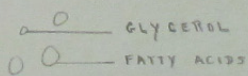
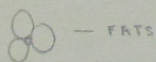
1.



2.

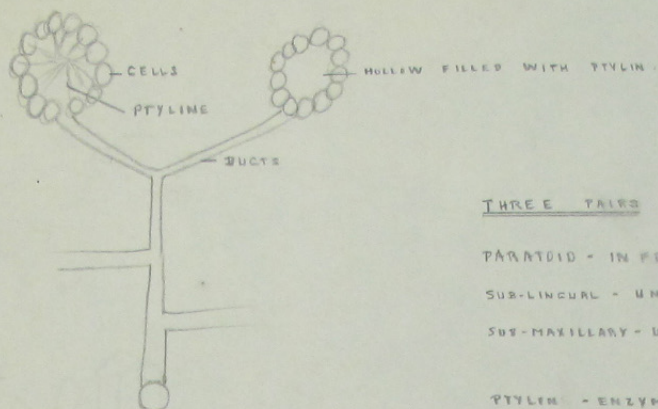


3.





# SALIVARY GLANDS.



## THREE PAIRS

PAROTID - IN FRONT & BELOW EAR

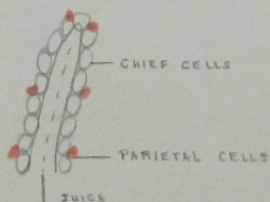
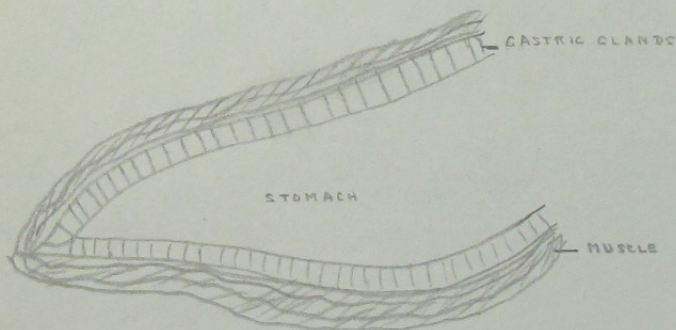
SUB-LINGUAL - UNDER TONGUE

SUB-MAXILLARY - UNDER JAW AT BASE OF TONGUE

PTYLIN - ENZYME IN SALIVA

INGESTED - EATEN

# GASTRIC GLANDS.

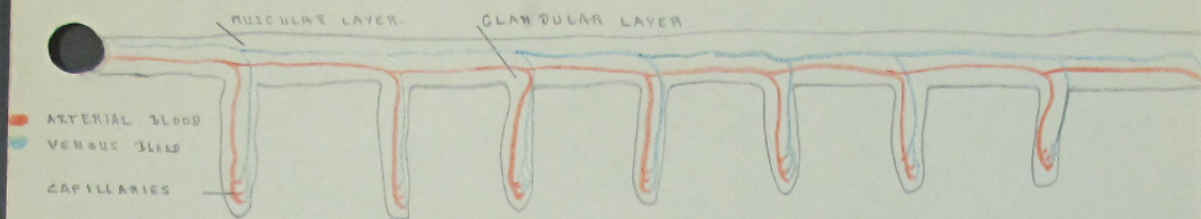


CHIEF CELLS MANUFACTURE PEPsin

PARIETAL CELLS " ACID



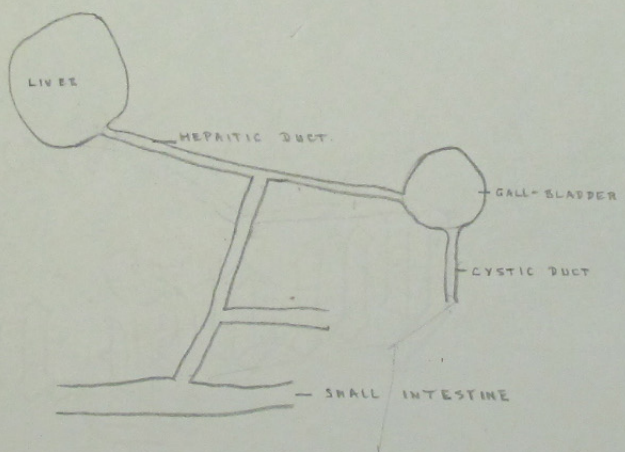
# INTESTINAL VILLI.



VILLI - BLOOD & LYMPH VESSELS

liquid in lymph vessels - chyle

## LIVER.





- lymph - liquid part of blood.
  - fills lymphatic vessels.
  - contains white corpuscles, which fight disease germs.
  - lymph nodes - where white corpuscles made.
  - lacteals - pick up fat + digest it.

- \* liver
  - secretes bile - hepatic duct.
  - bile contains no ferments.

Bile salts - produce right medium for fat digestion.

- Pancreas - manufactures insulin (sugar).
  - produces pancreatic juice.
  - contains ferments.

- trypsin - proteins - peptides (amino acids)

- amylase - carbohydrates - maltose.

- steapsin - fats - fatty acids + glycerine.

- lipase - fats - " "

- rennin - curdles milk.

Requires alkaline medium.

- Intestinal juice - contains hormone - secretion.
  - contains enzymes.

- trypsin - peptides - amino acids.

- maltase - maltose - disaccharides.

- lactase - lactose - glucose + galactose.

- sufrase - cane sugar - glucose molecules.

- lipase - fats - fatty acids, glycerine.

liver - storehouse for sugar (glucose)

- portal veins carry it there.

- glucose - glycerine (energy food for muscular contractions.)



- food contains cellulose + bulk.
- fatty acids + glycerine picked up by lymph vessels (lacteals).
- \* - glucose + amino acids absorbed directly into the blood stream.

Food - protein - tissue builder.  
fat - insulator, supplies heat + energy  
carbohydrates - in liver as glycogen  
 - energy food for muscle contraction.

Protein - eggs, meat, milk, nuts, peas, beans, cheese, bread, chocolate.

Fats - bacon, butter, cream, lard, olive oil, pork, suet, walnuts.

Carbohydrates - starches + sugars.

Proteins - amino acids - chief constituent of protoplasm.

Carbohydrates - reduced by digestion to glucose + sugar.  
 - these stored in liver + muscles.  
 - next oxidized to  $CO_2$  + water.  
 - give energy.

Fats - into fatty acids + glycerol.  
 - fatty acids combine with alkaline substances in alimentary canal to form soaps. - absorbed. - fat.  
 - then into lymph + disappear.  
 - oxidized to  $CO_2$  + water - liberated energy.  
 - body fat is conversion of carbohydrates.



## ● Absorption -

- chiefly in stomach & small intestine.
- simpler substances directly into bloodstream & lymphatics & then into blood (through villi cells)
- by osmosis & diffusion.
- fat globules & amino acids absorbed directly into blood stream.
- glycogen into blood as dextrose
  - goes to muscles - reconverted into glycogen - produces energy.
- carbohydrates absorbed as dextrose & levulose<sup>fructose</sup> - collected by liver & stored as glycogen.

## ● Nutritive requirements of body

- cell protoplasm destroyed as body cells act.
- excretory organs - lungs, skin, kidneys & intestines.  
(urea, uric acid,  $\text{CO}_2$ )

## Body requires food.

- 1) make good use of material used in production of work.
- 2) to supply elements of growth for new tissue & for broken-down tissues.
- 3) to regulate & coordinate processes.

● Adrenalin - hormone from adrenal gland.

● Caloric - ht. required to raise 1 Kg. water  $1^\circ\text{C}$ .

Calorimeter - instrument which measures heat.



Hormone - chemical substance produced by a gland or organ, + discharged directly into the blood, influencing the activity of other glands or organs.

Metabolism -

direct - calorimetry - heat rises, temp. of water.

indirect - measure  $O_2$  used. (basic met)  
- measure  $CO_2$  produced.

depends on surface areas.

Inorganic salts -

- oxidized to produce energy.
- contribute to formation of tissues.

help - promote + control metabolic processes.

- aid bone + teeth + muscle + blood cell development.

- in solution in body fluids.

- affect elasticity + irritability of muscle + nerve.

- supply elements influencing chemical composition of digestive juices + other secretions.

- determine osmotic pressures + solvent powers of body fluids.

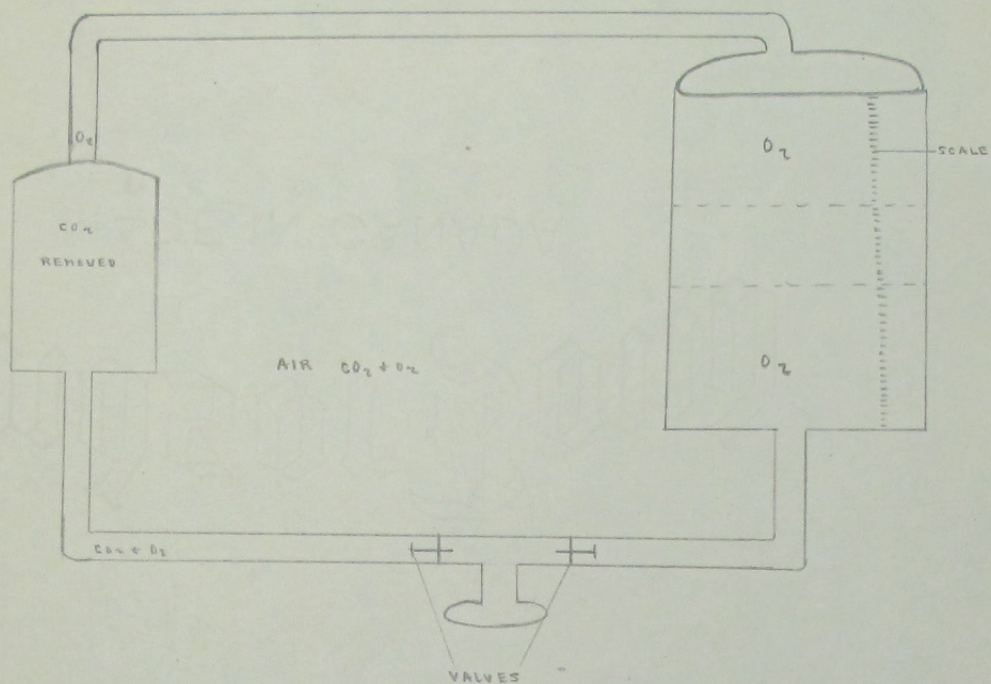
Water - constituent of blood + lymph.

- in digestion - promotes chemical changes in foods necessary for their absorption.

- facilitates absorption



RESPIRATION GALVANOMETER.





- holds constituents of blood + other fluids in solution.
- promotes general metabolic activity.
- solvent for some products of metabolism.
- aids in elimination of wastes.

### Nitrogen equilibrium.

- amt. of N<sub>2</sub> in body wastes = amt. eaten.
- maintenance diet - nitrogen equilibrium.
- if amt. excreted exceeds amt. taken in - body protein disintegrates.

### Factors determining food requirements.

- amount of muscular work.
- condition of the individual.
- age, sex, occupation.





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